R10429490

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-CXP-VSL-00026A

Project:	***RPP-WTP***	P&ID:	***24590-PTF-M6-CXP-P0010, 24590-PTF-M6-CXP-P0011, 24590-PTF-M6-CXP-P0013***
Project No:	***24590***	Process Calculation:	***Deleted*** 1
Project Site:	***Hanford***	Vessel Drawing	***24590-PTF-MV-CXP-P0008***
Description:	***Cesium Ion Exchange Treated LAW Collection Vessel***		

Reference Data

Charge Vessels (Tag Numbers)	
Pulsejet Mixers / Agitators (Tag Numbers)	***CXP-PJM-00002, CXP-PJM-00003, CXP-PJM-00004, CXP-PJM-00005, CXP-PJM-00006, CXP-PJM-00007***
RFDs/Pumps (Tag Numbers)	

Design Data

Quality Level	***See Vessel Drawing***		Fabrication Specs	***24590-WTP-3PS-MV00-TP001***		
Seismic Category	***SC-I***		Design Code	***ASME VIII Div 1***		
Service/Contents	***Radioactive Liquid***		Code Stamp	***Yes***		
Design Specific Gravity	***1.26***		NB Registration	***Yes***		
Maximum Operating Volume gal	***34,370 (Note 3)***		Weights (lbs)	Empty	Operating	Test
Total Volume gal	***39,000 (Note 3)***		Estimated	***81,400***	***447,000***	***407,000***
Environmental Qualification 1	***N/A***		Actual * (lbs) 1	***75,000***	***440,000***	***400,000***

Inside Diameter	inch	***180***			Wind Design	***Not Required***	
Length/Height (TL-TL)	inch	***294***			Snow Design	***Not Required***	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	***24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001***	
Internal Pressure	psig	***Atm***	***15***	***N/A***	Seismic Base Moment *	ft*lb	
External Pressure	psig	***0.12***	***FV***	***N/A***	Postweld Heat Treat	***Not Required***	
Temperature	°F	***113***	***138***	***N/A***	Corrosion Allowance	inch	***0.04***
Min. Design Metal Temp.	°F	***40***			Hydrostatic Test Pressure *	psig	***20*** 1

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

ISSUED BY
RPP-WTP PDC

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6/2/05

EXPIRES 12/10/05

This Bound Document Contains a total of 5 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
1	6/2/05	Issued for Permitting Use	K. Brightman	R. Simmons	C. Slater	M. Hoffmann
0	5/26/04	Issued for Permitting Use				

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** *24590-PTF-MV-CXP-VSL-00026A*

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***SA-240 316 (Note 2)***	***See Drawing***	***Auxiliary (Note 1)***
Shell	***SA-240 316 (Note 2)***	***See Drawing***	***Primary (Note 1)***
Bottom Head	***SA-240 316 (Note 2)***	***See Drawing***	***Primary (Note 1)***
Support & Vacuum Ring 1	***SA-240 304 (Note 2)***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA-240 316 (Note 2)***	***See Drawing***	***Thermowells Primary (Note 1)***
Pipe	***SA-312 TP316 Seamless (Note 2)***	***See Drawing***	***Note 1***
Forgings/ Bar stock	***SA-182 F316 (Note 2)***	***See Drawing***	***Note 1***
Gaskets	***N/A***	***N/A***	***N/A***
Bolting	***N/A***	***N/A***	***N/A***

Miscellaneous Data

Orientation	***Vertical***	Support Type	***Skirt***
Insulation Function	***Not Applicable***	Insulation Material	***Not Applicable***
Insulation Thickness (inch)	***Not Applicable***	Internal Finish	***Welds Descaled as Laid***
		External Finish	***Welds Descaled as Laid***

Remarks

**** To be determined by the vendor***

Note 1: All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination.

Note 2: Maximum carbon content of 0.030% for all welded components.

Note 3: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 4: This vessel is located in a Black Cell.

Note 5: Contents of this document are Dangerous Waste Permit affecting.

Note 6: Deleted. 1

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-CXP-VSL-00026A***

Equipment Cyclic Data Sheet

Component Plant Item Number:	***24590-PTF-MV-CXP-VSL-00026A***
Component Description	***Parent Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA-240 316***
Design Life	***40 Years***
Component Function and Life Cycle Description	***This vessel receives and stores waste in a batch transfer. It shall be designed to be filled to the maximum content level over a period of 22 hours and emptied in 10 hours to complete a 32 hour cycle. Additionally, this vessel will be subjected to fluid dynamic forces from the operation of the pulse jet mixers during the process of suspending the solids. This vessel is washed down not more than once per year.***

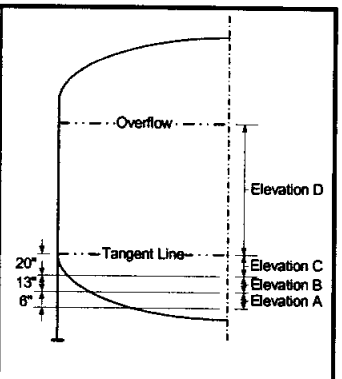
Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10***	***Nominal assumption for testing***
Operating Pressure	psig	***-0.12***	***0***	***N/A***	***This vessel will remain under constant pressure depending upon the vessel vent system***
Operating Temperature	°F	***59***	***113***	***N/A***	***Temperature will not cycle appreciably with vessel cycling***
Contents Specific Gravity		***1.00***	***1.26***	***N/A***	***Normally 1.2 without cycling***
Contents Level	inch	***43***	***309***	***3690***	***Liquid level from crown of bottom head***
Localized Features					
Supports				***Same as contents level***	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

Hydrodynamic Loading (1)

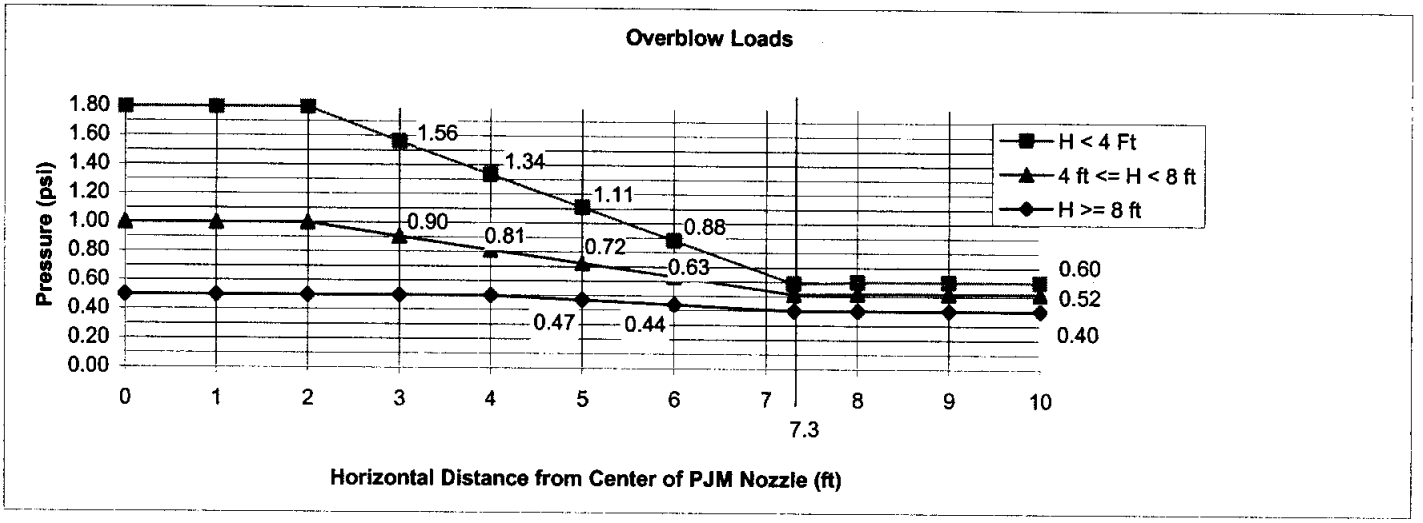
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure for ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi								Number of Cycles
Elevation A		Elevation B		Elevation C		Elevation D		
Radial	Vertical	Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.09 to 0.29	*-0.74 to 0.48*	*-0.02 to 0.22*	*-0.01 to 0.40*	*-0.05 to 0.12*	*-0.01 to 0.40*	*-0.03 to 0.10*	*-0.01 to 0.40*	*21.5 X 10^4*

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- *Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*

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Equipment Cyclic Data Sheet

Component Plant Item Number:	***24590-PTF-MV-CXP-PJM-00002, 24590-PTF-MV-CXP-PJM-00003, 24590-PTF-MV-CXP-PJM-00004, 24590-PTF-MV-CXP-PJM-00005, 24590-PTF-MV-CXP-PJM-00006, 24590-PTF-MV-CXP-PJM-00007***
Component Description	***Pulse Jet Mixers***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA-240 316***
Design Life	***40 Years***
Component Function and Life Cycle Description	***These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) states. Thrust load shall be applied only to the fully buoyant state. Assume the parent vessel is full for 50% of the number of PJM cycles.*** 1

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***80***	***10***	***Nominal assumption for testing***
Operating Pressure	psig	***FV***	***72.5***	***2.15 x 10^7***	
Operating Temperature	°F	***59***	***113***	***N/A***	***Temperature will not cycle appreciably with vessel cycling.***
Contents Specific Gravity		***1.00***	***1.26***	***N/A***	***Normally 1.2 without cycling***
Contents Level	inch	***Empty***	***Flooded***	***2.15 x 10^7***	
Thrust 1	lbf	***0***	***314***	***2.15 x 10^7***	
Localized Features					
Nozzles					
Supports		***Buoyant/Loaded***		***Same as contents level***	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***